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International Commodity Markets

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Coffee Pricing Policies in the Dominican Republic

Panos Varangis

Export taxes must be substantially reduced to encourage farmers to rehabilitate the Dominican Republic's coffee industry.

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Coffee is an important crop for the Dominican Republic, accounting on average for 11 percent of total exports by value during 1982-84. But for the last 10 years or so, coffee yields have been low, and production and exports stagnant. Yields are poor because the trees are very old, poorly cared for, and planted too far apart.

If current policies for coffee continue, production and exports are likely to decline even further. The Dominican Republic could have difficulty filling its export quota under the International Coffee Agreement (ICA). It could lose its export quota share and therefore its share of the high-priced markets.

Varangis sees the high tax on coffee exports as the main disincentive to growth in coffee production. With a small econometric model of the Dominican coffee sector, he simulated the impact of export tax reductions under different assumptions about the operation of the ICA export quota system.

The model's results suggest that production will decline if present pricing policies continue — and that the decline will be much steeper if the ICA export quota agreement is not renewed in September 1989.

Tax cuts seem to be crucial if the export quota system is not renewed. Without a quota and without tax cuts, real producer prices could fall significantly — about 30 percent the first year and 15 to 20 percent over the following three years. Under those circumstances, coffee farmers would probably lose interest in growing coffee.

The model suggests that if the ICA is continued, an export-tax cut of 52 percent would produce the desired production level (to meet projected quota and nonquota export demand) by 2000. If the ICA is discontinued, the export tax must be eliminated to achieve the same production level.

This paper is a product of the International Commodity Markets Division, International Economics Department. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Dawn Gustafson, room S7-044, extension 33714 (41 pages with charts and tables).

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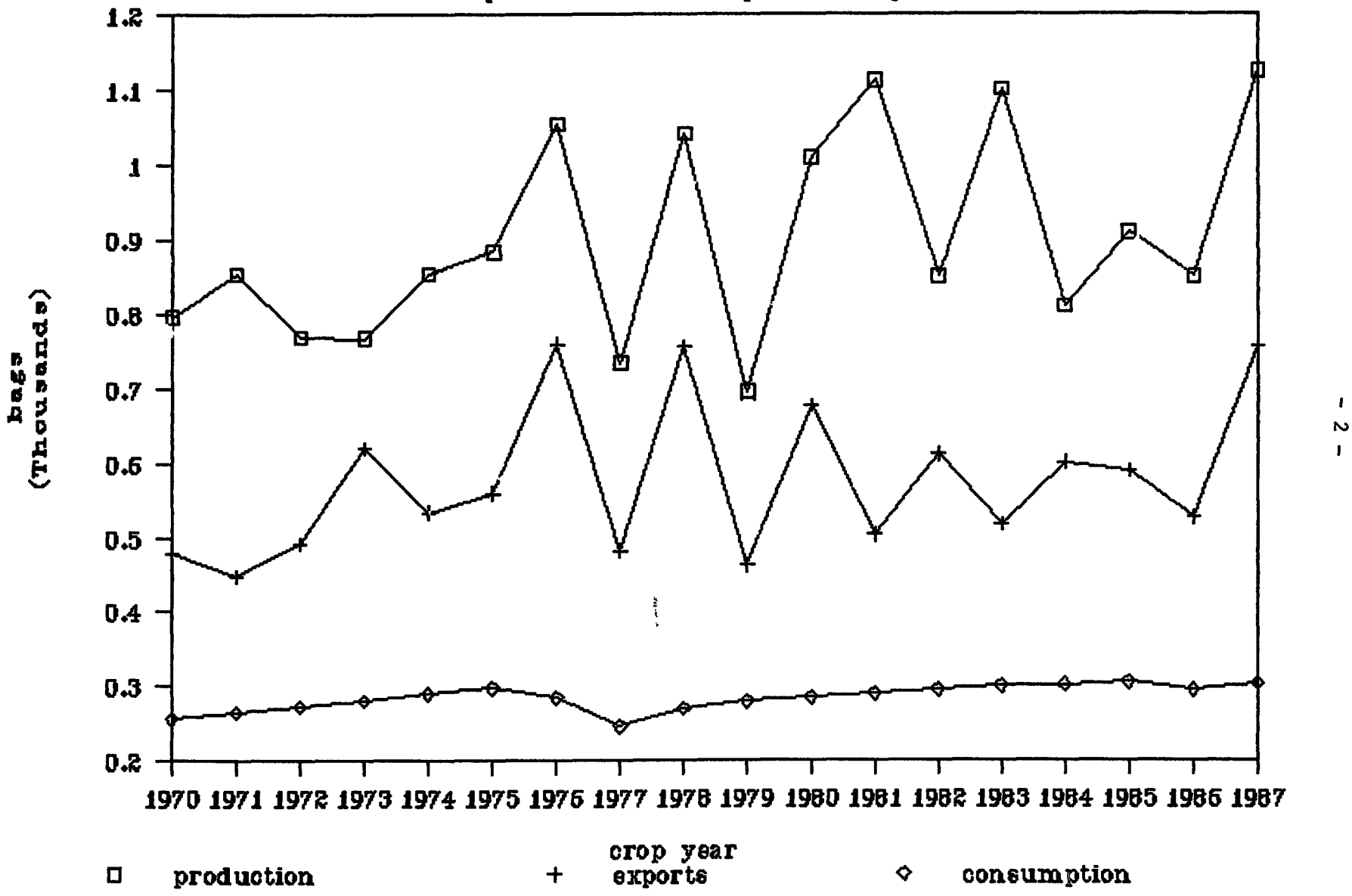
I. INTRODUCTION

1. In terms of export revenues, coffee is the second most important agricultural commodity in the Dominican Republic. On the average for the period 1976-86 coffee exports made up 22% of the Dominican Republic's primary product exports. Coffee contributes directly or indirectly to the total or partial support of about 700,000 people (9.5% of total population).

2. Coffee production in the Dominican Republic increased during the 1960s and early 1970s but stagnated after 1975. The direct reason for this stagnation was the stagnation in the planted area along with the limited renovation and rehabilitation of coffee growing areas. Average production over the last 12 crop years was 950,000 bags 1/ with yearly fluctuations of around 30% mainly due to climatic variability. Neither production nor exports show an increasing trend (see Chart 1). After reaching a peak during the 1977/78 crop year, exports declined and stabilized at around 530,000 bags until the 1986/87 crop year. Domestic consumption has fluctuated between 280,000 and 305,000 bags during the last 10 years with no clear trend.

1/ 1 bag = 60 kg.

CHART 1: *Dominican Republic*



Source: ICO

3. Dominican coffee sells for about 7% less than "Other Milds" 1/ on the world market; reflecting primarily the lower quality of the Dominican coffee, which was found to be due to inappropriate processing after harvesting. 2/ However, better quality Dominican coffee has, in the past, sold at prices higher than "Other Milds" and close to or equal to Colombian coffee.

4. This paper reports on the perceived constraints to the development of the Dominican Republic's coffee subsector and evaluates the impact of policies which would contribute to improving its performance. The paper is organized as follows. Section II presents the main characteristics of the coffee sector and the issues arising from its management. Section III presents policy changes recommended to rejuvenate the sector. Section IV describes a small econometric model of the coffee subsector built to evaluate policy changes and presents projections of coffee production and exports under different policy regimes and different world market environments.

1/ Refers to the International Coffee Organization (ICO) Indicator Price for "Other Milds" which are primarily coffees produced in Mexico and Central American countries.

2/ A comparison of export unit values between Dominican coffee and coffees in the categories of "Other Milds" and "Colombian Milds" is given in Annex Table 1.

II. A PROFILE OF THE COFFEE SECTOR

Crop Area and Yields

5. Coffee occupies about 157,000 hectares of land and is grown on 71,235 farms with an average size of about 2.1 hectares. More specifically, 94% of the farms are 6.3 hectares or less and occupy 78% of the total area under coffee (see Annex Table 2). Coffee growing is therefore a smallholder activity which is present on nearly 20% of all farms. Of the total area under coffee, 56,000 hectares (or 36%) is in climatically-marginal areas, meaning areas below 500 meters of altitude. More than 50% of the coffee trees are more than 50-60 years old, i.e., beyond normal useful economic life in most countries, which is 20-25 years. The density of planting is about 1,200 trees per hectare compared to about 3,500 in Costa Rica and 2,900 in Guatemala. The predominant variety is the "typica", a traditional variety; although new high-yielding varieties are being introduced, especially the "caturra" and "catuai". There is no attempt to control the shade over coffee trees. Stumping (a pruning practice to enhance yields) is not carried out.

6. As a result of the the above poor management practices, as well as the fact that there is no application of fertilizers or pesticides, yields typically are very low (by any comparison). The average yield is about 45-50 lb/tarea 1/ or 7.2-8.0 qq/ha (quintals per hectare). 2/ In Costa Rica the average yield is 35 qq/ha; in El Salvador it is 22 qq/ha and in Honduras 16 qq/ha. The cross-farm variation in yields is considerable--from 6.4 qq/ha to

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1/ 15.92 tareas = 1 ha.

2/ 1 quintal (qq) = 100 lb = 45.36 kg.

over 32 qq/ha. It has been calculated that about 70% of the farms have yields of around 6.4 qq/ha, 20% around 12 qq/ha and 10% around 32-38 qq/ha.

7. Without renovation or replanting and given continuation of the poor husbandry practices on the majority of farms, production is likely to decline. The average age of trees will increase, yields will decline further, and as the trees get older a higher proportion will die. In 1987 the government, through the Coffee Department of Secretaria de Estado de Agricultura (SEA), began implementation of a program of rehabilitation of the old orchards--the program of the Presidency (Programa de la Presidencia). The goal is to rehabilitate around 6,200 ha each year over for the next three years. The program includes the provision of fertilizers, pesticides and seedlings at subsidized rates. Preliminary data are expected to be published soon to show the results of this program so far.

Production and Exports

8. As a result of the stagnating crop area and yields, coffee production has been largely stagnant with an average year-to-year variation of 30% due to weather influences (see Annex Table 3). While domestic consumption also remains stagnant, Dominican coffee exports to ICO members have declined. 1/ As a result, its share of the ICA global export quota has fallen from 1.05% to 0.84% over the 1981/82-1987/88 period (see Table 1). This inability to fill the ICO export quotas is costly in the short-term in that coffee sales at prices supported by the International Coffee Agreement are foregone and, in

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1/ Coffee exports declined due to the loss in the share of the global quota. The quota share may further decline as unwashed arabicas are expected to become even less desirable in the future.

Table 1: DOMINICAN REPUBLIC'S SHARE IN THE ICA GLOBAL COFFEE EXPORT QUOTA

Coffee Year	%
1980/81 (Oct-Sept)	0.84
1981/82	1.05
1982/83	0.91
1983/84	0.91
1984/85	0.91
1985/86	0.84*
1986/87	0.94*
1987/88	0.84

*Quota was suspended from February 1986 to September 1987.
Source: International Coffee Organization (ICO).

the longer-term, the country is liable to see its export quota decline because of non-fulfillment of quota.

9. In Annex Table 4 exports are divided into ICA member and non-member exports. 1/ As can be seen from this table, exports to non-member countries are non-systematic and over the last four years have reached quite low levels, even zero. Under the ICA quota scheme exports to non-member countries can be considered a safety valve in times of high production and excessive stock accumulation.

1/ Exports to non-members are usually sold at prices 20-30% lower than those to ICA members.

Quality and Processing

10. The issues of quality and processing of coffee are interrelated in the Dominican Republic. Genetically, the type of coffee grown is of good quality and equal to coffees grown in Guatemala and Costa Rica--both producing good quality coffees. About two-thirds of the coffee-growing area is located between 600 and 1,100 meters of altitude, in areas of good rainfall and overall excellent growing conditions. Until recently, there were no serious diseases and pests affecting the coffee plants. Thus, good processing would maintain the inherent qualities of the coffee cherries. However, Dominican Republic coffee is not of the quality standard of similar coffees grown under similar conditions (this quality differential is reflected in a comparison of unit values of exports, see Annex Table 1). It is estimated that as much as 80% of the quality defects are caused by inappropriate processing. About 90% of the production is processed by small producers who neither have the means nor the know-how to perform the appropriate processing. The coffee cherries are usually processed with incomplete pulping and washing. Coffee cherries are left to ferment between picking and pulping, and again after pulping. It is mostly the case that there is not enough space on the cement patios for coffee to dry, so that after washing coffee is either piled up to dry--thus contributing to overfermentation--or dried on the ground and thus acquiring the flavor of mold. Washing facilities are seldom of acceptable standard. In the Barahona region, where the quality of cherries is very good, the dry method (drying without previously washing the depulped coffee cherries) is used which yields low quality beans. The sorting of coffee is not done carefully, and, as a result, coffee beans are not homogeneous in size and

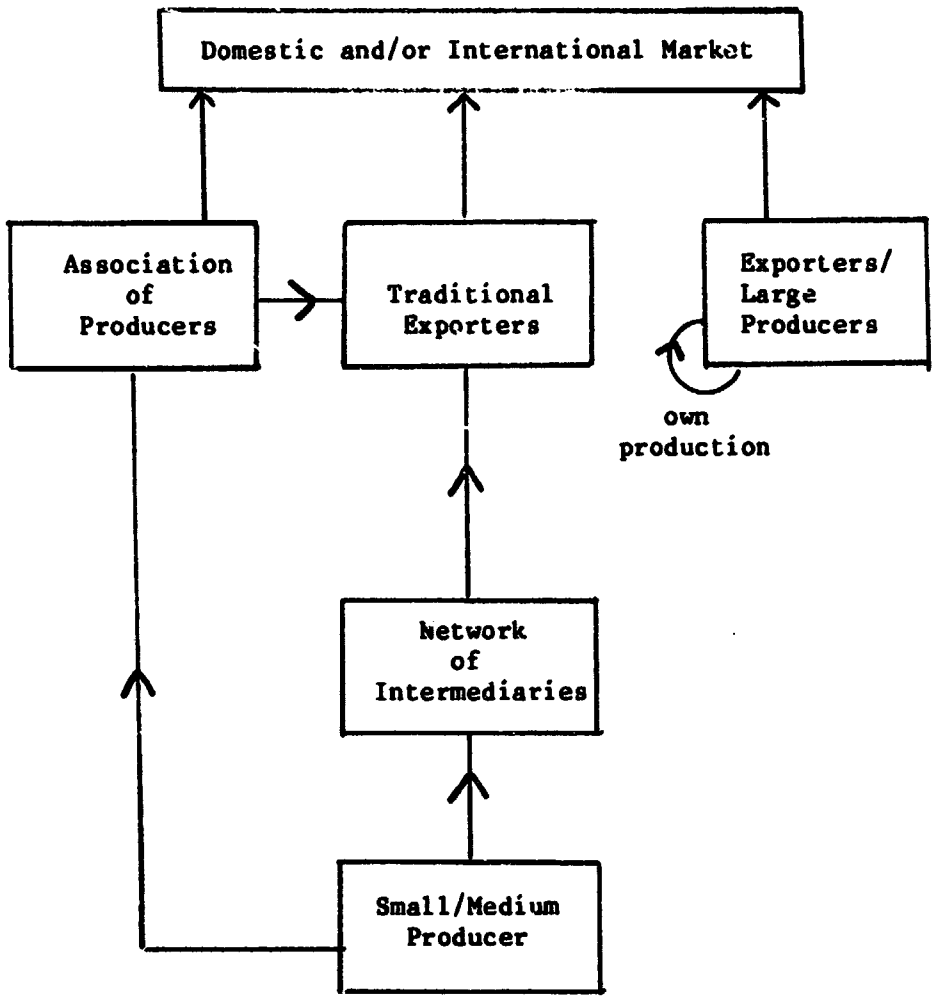
different qualities of coffee are mixed together. If the coffee cherries are not sorted before pulping and pass through the same pulper, the smaller cherries are not pulped while the larger ones are damaged.

Commercialization

11. The network of coffee marketing can best be seen from Chart 2. The government is not involved in coffee buying from the producers. The bulk of coffee for export is channeled through private exporters, which handled 87% on average during the 1976/77-1985/86 period. Producer associations exported an average of 10% and producers/exporters 3%. When ICA export quotas are in effect, the governmental Coffee Commission is responsible for allocating the export quota between producers/exporters, traditional exporters and associations. Currently, the export quota is allocated as follows: 75% to traditional exporters, 20% to producer associations and 5% to producer exporters.

12. The traditional exporters obtain their coffee through a network of intermediaries who buy it from the farmers. Producer associations buy their coffee from their associates; though some associations extend their purchases outside their associates. Small producers do not always show interest and trust in joining producer associations. They prefer to diversify their markets and sell part of their coffee through intermediaries and part through associations. Other growers prefer dealing with intermediaries only. The system of payment by producer associations is as follows: as soon as the farmer brings his coffee to the association he receives a payment equal to the

Chart 2: NETWORK OF COFFEE COMMERCIALIZATION IN THE DOMINICAN REPUBLIC



price recommended to the grower. 1/ At the end of the financial year, the association distributes part of any profits back to its associates. The remainder is held by the association. Currently, the share withheld by the associations is estimated be be RD$7-10 per 100 lb of green coffee, which is 2-2.5% of f.o.b. value. The availability of credit is the effective limit on coffee purchases by producer associations. By avoiding the intermediary network, producer associations usually manage to pay higher prices to the growers. There are times, however, when intermediaries and exporters bid up the prices paid to the growers for speculative purposes--usually on the expectation of increases in international coffee prices or of changes in government policies affecting the coffee subsector.

13. Exporters' and intermediaries' margins are claimed to be excessive, although there are no concrete data to substantiate these claims. Table 2 presents an attempt to quantify these margins. 2/ From the table three points can be made: (1) the real margins fluctuated considerably between 1973 and 1987; (2) the network of intermediaries and exporters took advantage of the high coffee prices in the late 1970s, and recently in 1986, to raise their margins; and (3) in the last four years real margins have increased as

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1/ The price recommended to the grower is an indicative price published periodically by the Secretariat of State for Agriculture. This price is compiled by surveying exporters on what they pay for the coffee they purchased and it is based on the world coffee price for "Other Milds" arabicas c.i.f. New York.

2/ In the table commercialization and industrialization margins are not separated. The reason is that while the f.o.b. export price refers to green coffee, the price paid to the growers refers to parchment coffee. The difference between the two prices (under the column commercialization and industrialization margins) includes the cost of processing the parchment coffee into green coffee.

Table 2: ANALYSIS OF COFFEE PRICES 1973-1987

(US$/100 lb and RD$/QQ)

Year	World Price /a (US$)	Export Price (f.o.b.) (US$)	Export Price (f.o.b.) (RD$)	Export Price Net of Tax (f.o.b.) (RD$)	Producer Price /b (RD$)	Commercialization and Industrialization Margins /c (RD$)	Commercialization and Industrialization Margins /c (%)	Real Margins /d (RD$)
1973	62.3	53.80	53.80	53.80	30.00	23.80	44.2	49.5
1974	65.8	63.05	63.05	63.05	30.00	33.05	52.4	60.8
1975	65.4	55.32	55.32	54.24	42.00	12.24	22.6	19.6
1976	142.8	88.08	88.08	74.83	46.00	28.83	38.5	43.0
1977	234.7	206.56	206.56	128.60	79.94	48.66	37.8	64.9
1978	162.8	151.28	151.28	137.87	68.32	69.55	50.4	88.6
1979	173.5	139.61	139.61	93.14	58.25	34.89	37.5	40.7
1980	154.2	165.71	165.71	154.95	62.00	92.95	60.0	92.9
1981	128.1	103.30	103.30	98.20	66.00	32.20	32.8	30.0
1982	139.9	118.83	118.83	110.01	86.50	23.51	21.4	20.3
1983	131.6	116.75	116.75	108.71	84.00	24.71	22.7	20.5
1984	144.3	130.15	171.80	155.92	92.80	63.12	40.5	41.0
1985	146.6	123.66	244.85	207.76	119.50	88.26	42.5	41.7
1986	194.8	168.89	457.69	322.15	184.50	137.65	42.7	59.1
1987 /e	113.7	99.00	380.2	283.1	143.1	140.0	49.5	50.9

/a Price of "Other Mild" arabicas, average c.i.f. New York and Bremen/Hamburg.
/b The producer price refers to parchment coffee, while the export price refers to green coffee.
/c Calculated as the percentage of the f.o.b. price net of taxes.
/d The real margin is obtained by deflating the Dominican consumer price index.
/e Estimates.

Sources: Calculations based on data obtained from C.A. Benito, R.D. Norton and T. Suriel, "Un Analisis Cuantitativo del sector Cafetalero Dominicano", April 1988.

compared to the early years of the 1980s which succeeded the coffee price boom of 1976-79.

14. The variable nature of commercialization margins makes it difficult to establish a unique and reliable producer price series. Coffee is sold by the farmer in four different forms: (1) on the tree, with the purchaser paying for the collection of cherries and all the processing; (2) as cherries, with the farmer bearing the cost of collection and leaving all the processing in the hands of the purchaser; (3) as parchment, with the farmer collecting the cherries and doing some of the processing; and finally (4) as green coffee with all processing done by the farmer. The translation of the different categories of coffee prices received by growers into green coffee equivalent prices does not yield a consistent set of producer prices.

Coffee Prices and Taxes

15. The price paid to growers is calculated as follows: the c.i.f. spot price of green coffee in New York is adjusted for freight costs and insurance (US$4.50 for 100 lb) and quality (a deduction of US$5.50 for 100 lb) and multiplied by the official exchange rate to derive the f.o.b. price. The export tax is a progressive ad valorem tax and is currently applied as follows: up to a f.o.b. price of RD$250/100 lb there is no tax; between RD$250 and RD$299 a 30% tax is applied; for a price of RD$300 and above there is a tax of 40%. A "voluntary" contribution of RD$4.08/100 lb to the Coffee Commission is added to the tax. After taxes, the voluntary contribution together with the costs of exportation (around RD$30-35/100 lb) and commercial margins, as well as other costs, are subtracted from the f.o.b. price and the

price paid to the growers is the residual. For example, for a recent f.o.b. price of RD$808/100 lb. the growers received RD$408 (or 50.5% of the f.o.b. price) while the export tax was RD$218 (equivalent to an average 27.5% tax rate). Net of export charges the f.o.b. price was RD$586.14/100 lb, which was further reduced by a RD$35/100 lb of export cost and a RD$142.90/100 lb profit margin as well as other costs (e.g., transportation) for the exporters and intermediaries. Exporters provide to SEA 1/ a record of the prices which they pay to growers. It is claimed in some quarters that the growers do not receive these prices but some lower price. However, the correlation coefficient between the price quoted as paid to growers and the world price for "Other Mild" arabicas is 0.92, which shows that prices quoted as paid to growers by exporters reflect world price movements reasonably well. Table 2 provides series for the period 1973-87 for the prices of "Other Milds" and the prices recommended by SEA to be paid to growers, as well as the implicit export taxes and marketing costs and margins.

1/ SEA stands for Secretaria de Estado de Agricultura, which is the equivalent of the Department (Ministry) of Agriculture.

III. POLICIES TO IMPROVE THE PERFORMANCE OF THE COFFEE SECTOR

16. In this section policies to improve the performance of the coffee subsector in the Dominican Republic are presented. There are two general areas in which improvements are needed; first, in the technical area and second, in the area of pricing policy.

Technical Issues

17. In the technological area there is an obvious need for the introduction of the new, high-yielding varieties of coffee trees to provide the opportunity for higher production; next, there is need for improvement in the quality of the coffee beans which will only be achieved with the establishment of coffee washing stations; and finally, there is need for improvements in the marketing of coffee via the establishment of new markets and marketing channels.

A. Coffee Replanting

18. Replanting to replace the aged trees should take place gradually so as not to cause serious disruption in production and farm income. This can be done by planting the new coffee trees under the existing ones and maintaining a part of the old plant until the new plants are able to produce.

19. Replanting should receive priority in areas of at least 500 meters elevation (600 meters for the southern region) in order to obtain good quality

coffee. Before replanting, good soil preparation should take place and the lay-out of the plantation should be evaluated. Replanting need not be limited to plantings of new varieties. Higher yields per hectare could be obtained from existing varieties if higher planting densities are applied. The density of planting should be dependent on the variety planted and the terrain. Planting density can be as close as 2 x 1 meters (for Caturra) with two plants per hole. In this way a density of up to 5,000 plants per hectare can be achieved. Shade over the coffee trees should be controlled. Taller trees that cast too much shade should be cut. Fertilization, weed control and disease control should also be implemented, especially now that the disease "leaf rust" is affecting trees. Finally, each fifth to seventh year of a tree's life "stumping" should be practiced to maintain vigorous yields.

B. Establishment and Operation of Coffee Washing Stations

20. It has been estimated that about 80% of the defects in coffee quality are due to inappropriate processing of the coffee cherries by the small growers. Washing stations to produce fully-washed coffee are recommended given the good genetic quality of the Dominican coffee and the premium paid for fully-washed coffee in the international market. This would mean the processing of coffee cherries by a processing station rather than by individual growers. Growers would have to transport their coffee cherries immediately after picking to the processing station. Delays in coffee transportation, due to poor road conditions, would cause serious quality defects. Accessibility to the stations should be ensured by the construction of rural roads.

21. As well as the premium paid for fully-washed coffees, processing by this method would increase production. With the fully-washed method it takes about five pounds of coffee cherries to produce one pound of fully-washed green coffee, whereas under the current processing technique in the Dominican Republic it takes six to seven pounds of cherries. 1/ The case for production of fully-washed coffee is also supported by the recent world demand trend toward higher-quality coffee, evidenced by the increase in price differentials between higher and lower quality coffees. 2/ The major difficulties associated with the production of fully-washed coffee are the need for greater attention by the grower during harvesting. To produce fully-washed coffee, coffee cherries have to have a uniform ripeness which is reflected in the color of the cherry. Also, the operation of washing stations requires skilled management and staff.

A cost benefit and a cash flow analysis were prepared to analyze the economies of investment in coffee washing stations. In the cost benefit analysis, the costs of operation were divided into investment and operational costs. The costs of land, buildings, machinery and equipment, transportation, and initial operating capital were included under investment costs. The purchase of coffee cherries for processing, the maintenance of buildings and

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1/ It can also be argued that the system of washing stations proposed here can reduce the risks facing the grower due, for example, to the theft of his crop while drying or damage by rain during drying.

2/ The price differential between robustas and fully-washed arabicas was around 10% before the first half of 1987 and about 30% in 1988. If one takes into consideration that unwashed arabicas are more expensive than robustas but less expensive than washed arabicas, the price differential in the first half of 1987 between washed and unwashed arabicas should have been less than 10% (say around 5%) compared to 13-15% for 1988.

equipment, the costs of packing material, labor, administrative costs and contingencies were included in operating costs. The benefit from the project was the sale of washed green coffee at a premium of 18% above the price of unwashed green coffee. The total net benefit from the 20-year operation of a washing station is calculated to be US$1,780,000. The net present value (NPV) at 12% opportunity cost of capital is US$440,000 and the Internal Rate of Return (IRR) is 34.6%. Using the cash flow analysis, the cummulative net cash flow after the debt service (inflows minus outflows minus debt service) is estimated to be US$1,313,000. 1/ All calculations were performed at an exchange rate of RD$6.28 per US$. In the analysis above, the conversion between cherries and green coffee is 4.5 to 1 versus 6 to 1 for unwashed arabicas.

C. Coffee Marketing

22. Washing stations to produce fully-washed coffee should be the first step in the effort to improve quality. However, the improved quality coffee has to be accompanied by improvements in the marketing system. New markets should be identified that demand quality coffee and are willing to pay a premium. The European and Japanese markets have good prospects for coffee

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1/ With a 13% premium the total net benefit becomes US$1,496,000, the NPV is US$340,000, the IRR 29.4% and the cummulative net cash flow after the debt service is US$1,030,000.

imports. 1/ Even within the US market, better quality coffee is in greater demand. Experience in other coffee-producing countries has shown that selling directly to roasters rather than to traders can also increase profit margins.

23. Improvements in quality and improvements in marketing of coffee can contribute to increased coffee export revenues under the existing ICA export quota system, even if the quantity produced remains unchanged. They can also "cushion" the impact on coffee export revenues of a failure to renew the quota system. In the absence of the quota scheme, consuming countries would be freer to choose between origins and good qualities will receive preference.

Pricing Policy Issues

24. The government does not exert direct control over producer prices. However, it influences the price received by the producer in two ways: via exchange rate policies and via export taxes.

A. Coffee Export Taxes

25. As shown above, under the present export tax law, export costs and marketing margins, the price received by the grower is about 50% of the f.o.b. price. It is estimated that given the current and forecast world coffee

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1/ The World Bank is projecting the growth rate of European and Japanese coffee demand to be 1.7% p.a. and 4.1% p.a., respectively.

prices, the adoption of new, high-yielding technologies in coffee cultivation--which involves higher costs--is not profitable for the grower. Therefore, in order for the higher-yielding technology to be adopted, the export tax will have to be reduced. A new progressive tax schedule is proposed here which lowers average tax rates. Also, it is suggested that the tax schedule be based on dollar values rather than domestic currency. The latter recommendation is made in order to avoid increases in the average tax levels due to exchange rate depreciation (so-called "bracket creep"). 1/

26. In order to assess the effects of export tax reductions on key variables in the coffee subsector, a partial equilibrium model of the Dominican coffee subsector (described below) was constructed, based on the Akiyama-Trivedi vintage capital approach. 2/ Using this model, the long-run (10-year) export supply elasticity was estimated to be 0.87. Simulation runs were made for several export tax options, assuming that the suggested changes in the export tax schedule will take place in 1990. The effect of each of these new export tax schedules on the key variables was assessed for the year 2000.

1/ Calculations performed indicate that given the existing tax brackets in RD$ and an f.o.b. price of US$128.32, the average export tax rate will increase from 27.5% to 31.7% if the RD$ is devalued by 50% against the US$. In the case of 100% devaluation, the average export tax rate increases to 35.5%.

2/ See T. Akiyama, and P.K. Trivedi (1987), "Vintage Production Approach to Perennial Crop Supply", Journal of Econometrics (36, pp. 133-161).

27. Table 3 outlines three options for export tax reduction and their impact on producers' prices, exports and revenues. These three options are designed to reduce the average tax rate (at an f.o.b. price of US$119/QQ) by 33.3%, 52.4% and 68.6%. These tax reductions, assuming that they are fully passed to the producer, will augment the producer price by 15.1%, 23.8% and 31.1%, respectively.

28. The benefits from the export tax reduction are: (a) an increase in the competitiveness and profitability of the coffee sector in the Dominican Republic. By increasing profitability, adoption of the new, high-yielding technology should be possible; (b) an increase of production and exports as a result of (a); and (c) the increase of foreign exchange earnings as the result of export expansion by US$8.3, US$13.0 and US$17.0 million, respectively, for the three export tax reduction options. The cost for the government is the reduction of its revenues due to coffee taxation by 24.5%, 42.5% and 60.1% respectively. Given that the revenues from export taxation are roughly 4-5% of total government revenues, the reduction in coffee export taxation would mean a reduction in government revenues by roughly 1.1%, 1.9% and 2.7% respectively. However, this estimate does not allow for the likely possibility that, without the suggested improvements in management, coffee production could decline.

29. In order to protect real producer prices from erosion by inflation, the export tax schedule rates should be deflated by some inflation index; in effect, to adjust the US$ base prices for inflation. The deflator proposed here is the exchange rate adjusted Dominican CPI. More specifically, the

Table 3: OPTIONS FOR EXPORT TAX REDUCTION AND THEIR IMPACT ON PRICES AND REVENUES

	Current		Option I		Option II		Option III	
	RD$	%	US$	%	US$	%	US$	%
			60-70	20	60-70	10	80-100	20
	250-300	30	70-80	30	70-80	20	100-120	30
Range FOB Price	300	40	80	40	80	30	120	40
CIF US$/qq	134		134		134		134	
FOB US$/qq	119		119		119		119	
FOB RD$/qq	747		747		747		747	
Average Tax	25.9		17.3		12.4		8.2	
Tax/qq	194		129		92		61	
Tax Reduction/qq			65		102		133	
Tax Reduction/qq (%)			33.3		52.4		68.6	
Producer Price (PP)	427		492		529		560	
Increase in PP (RD$/qq)	0		65		102		133	
Increase in PP (%)	0		15.1		23.8		31.1	
/a								
Exports (qq)	528,597		598,108		638,002		671,810	
Increase in exports (qq)	0		69,511		109,405		143,213	
Exports (million of US$)	62.9		71.2		75.9		79.9	
Increase in Exports (millions of US$)	0		8.3		13.0		17.0	
Tax Revenue (millions of RD$)	102.5		77.4		58.9		40.9	
Tax Loss (millions of RD$)	0		25.1		43.6		61.6	
Tax Loss (%)	0		24.5		42.5		60.1	
Share of Tax Loss in Total Government Revenue (%)	0		1.1		1.9		2.7	

/a Below this point of the table all levels and differences refer to year 2000.

Sources: Mission estimates.

Assumptions: The elasticity of export supply is 0.87.
The exchange rate of RD$6.28/US$ in 1988.
All calculations are in constant 1988 prices.

Dominican CPI should be divided by the RD$/US$ exchange rate (EXCH) as follows:

$$DEFL_t = (CPI_t/CPI_{1980}) * (EXCH_{1980}/EXCH_t)$$

where 1980 denotes a base year.

Exchange Rate Policy

30. Under the existing exchange rate system, in operation since August 1988, the Dominican peso is pegged to the dollar. There is, therefore, a strong likelihood for the peso to become overvalued due to increasing domestic inflation. The government is showing, and has shown in the past, unwillingness to devalue in the face of increasing rates of inflation. An overvalued exchange rate acts just like a tax on exports, leading to declines in production and exports. To illustrate the importance of exchange rate policies on the coffee subsector the following simulation was performed using the partial equilibrium model of the Dominican coffee sector. It was assumed that the real exchange rate appreciates by 10% in 1990 and remains at this level until the year 2000. 1/ The base scenario for the simulation is the case where the real exchange rate stays at its 1988 level. Given the 10% one-shot appreciation, coffee production declines by 8% by the year 2000 as compared to the base scenario; which is equivalent to a decline of 13% as

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1/ That is, the real exchange rate is overvalued by 10% as compared to the 1988 real exchange rate.

compared to its 1988 level. The loss of export market shares by African exporters of primary products such as coffee, largely because of overvalued currencies, is a strong pointer to the dangers of such policies. Liberalization of exchange rate markets is the only sure way to avoid over- or under-valuation of currencies.

IV. PROJECTIONS OF PRODUCTION AND EXPORTS UNDER DIFFERENT SCENARIOS

31. In this section, the results of simulations with a small econometric model of the coffee sector in the Dominican Republic are reported. The purpose of the simulations was to estimate production and exports under different scenarios incorporating some of the policy changes recommended above. The model can be described by the following set of equations:

(1) $DBT = f_1(DBT(-1), \lambda PP)$ (behavioral)

(2) $BT = BT(-1) + DBT$ (identity)

(3) $PD = f_2(BI, \lambda PP, BT)$ (behavioral)

(4) $XAV = PD + ES(-1) - DC$ (identity)

(5) $X = f_3(XAV, \lambda PP)$ (behavioral)

(6) $ES = PD + ES(-1) - DC-X = XAV - X$ (identity)

(7) $PP = f_4(WP)$ (behavioral)

(8) $DC = f_5(RT, GDP, T,)$ (behavioral)

(9) $TDC = DC*POP$ (identity)

Note that if the International Coffee Agreement's export quota is operative, exports become exogenous and the model is reduced to equations (1), (2), (3), (6), (7), (8) and (9).

DBT : change in bearing trees

PP : real producer price for coffee

BT : bearing trees

PD : coffee production

BI : coffee biannual production cycle equal to PD(-1)/PD(-2)

XAV : export availability

ES : ending stocks

DC : per capita domestic consumption of coffee

X : exports

λ : lag operator

WP : world price

RT : deflated domestic retail price of coffee (because of data unavailability, the world coffee price multiplied by the official exchange rate and divided by the Dominican consumer price index was used).

GDP : real per capita GDP

TDC : total domestic consumption

POP : population

T : time trend

32. It is assumed that because the Dominican Republic has less than 1% of the global production and exports any change in its exports would not influence the world price. Hence, the world coffee price is exogenous to this model.

33. The estimated behavioral equations for the model are the following.

$$DBT = -6.011 + 0.428\ DBT(-1) + 0.032\ PP(-3)$$
$$(-3.63)\quad (2.71)\qquad\qquad (2.47)$$

$$+ 0.016\ PP(-4) + 0.005\ PP(-5)$$
$$(2.20)\qquad\qquad (1.60)$$

$R^2 = 0.90$ H : 0.153

(Note that the T-statistics are in parentheses.)

$$PD = -215.13\ BI + 1.44\ PP(-1) + 7.52\ BT$$
$$(-2.24)\qquad (2.88)\qquad\qquad (8.52)$$

$R^2 = 0.70$ D.W. : 2.209

$$DC = 148.4 + DC(-1) - 0.001\ RT + 0.0002\ GDP + 1.38\ T$$
$$(3.51)\qquad (2.64)\qquad (-4.22)\qquad (1.04)\qquad (2.18)$$

$R^2 = 0.85$ H : -0.132

$$X = \underset{(9.81)}{0.72}\ XAV + \underset{(1.84)}{0.63}\ PP$$

$R^2 = 0.73$ D.W. = 1.902

34. To perform the projections a forecast for the producer price of coffee was derived from the World Bank's forecast of the real c.i.f. price for "Other Mild" arabicas 1/ From that price US¢10/lb was subtracted to reflect freight, insurance and quality adjustment, thus deriving the f.o.b. price of Dominican coffee. Taxes were then subtracted, assuming the existing level of taxation, and exporters' and intermediaries' costs and profit margins were also subtracted. The latter are assumed to be equal to their 1987/88 level. Finally, the producer price was deflated by the Dominican CPI to obtain the real producer price for coffee. 2/

35. Historical data on production, exports and tree stocks were obtained from USDA (see Annex Table 3) while data on the producer price were obtained from the Coffee Department/SEA in the Dominican Republic and the International Coffee Organization. Table 4 gives the results for the production projections. Two external scenarios were considered. The first assumes that the current ICA export quota agreement holds and the second assumes the export quota agreement is not renewed after September 1989.

1/ See Annex Table 5 for world coffee price projections under different scenarios.

2/ In the projection both the Dominican exchange rate and the Dominican CPI are assumed to be at their 1987 levels.

Table 4: COFFEE PRODUCTION PROJECTIONS FOR THE DOMINICAN REPUBLIC

	Estimated Production Without the Policy Change				
	With Quota	Without Quota	Supply Elasticity /a	Targeted Production /b	Estimated Production Quota /c
	('000 bags)			('000 bags)	
1987	855.0	855.0	-	855.0	855.0
1988	900.0	900.0	-	900.0	900.0
1989	894.6	894.6	-	909.1	911.0
1990	889.7	820.8	0.14	919.9	902.2
1991	880.0	865.9	0.19	930.0	897.4
1992	873.6	838.0	0.20	940.3	891.5
1993	870.4	832.2	0.28	950.6	894.6
1994	864.4	805.9	0.34	961.1	893.5
1995	863.6	799.6	0.42	971.6	900.4
1996	862.6	783.5	0.51	982.3	906.4
1997	860.6	724.0	0.60	993.1	912.2
1998	860.9	759.4	0.69	1,004.0	920.3
1999	859.8	748.4	0.78	1,015.1	927.0
2000	857.5	737.5	0.87	1,026.3	932.3

/a The supply elasticity shows the accumulated percentage response of production over time to a 1% increase in the "recommended" price paid to the grower.

/b The targeted production is consistent with the projected world coffee import demand increase of 1.1% p.a.

/c Estimated production under quota given a 10% increase in real producer price in 1989 and thereafter.

Source: IECCM, World Bank.

36. It is projected that Dominican coffee production will decline by 4.7% between 1988 and 2000 under assumptions that the ICA quota system continues and that the present domestic tax system continues (see column 1, Table 4). If the export quota regime is not renewed in September 1989 and export taxes remain unchanged, coffee production is projected to decline by 18.1% over the projection period (see column 2, Table 4). As can be seen from Annex Table 5 there is expected to be a sharp fall in coffee prices in 1990 if the export quota regime is suspended.

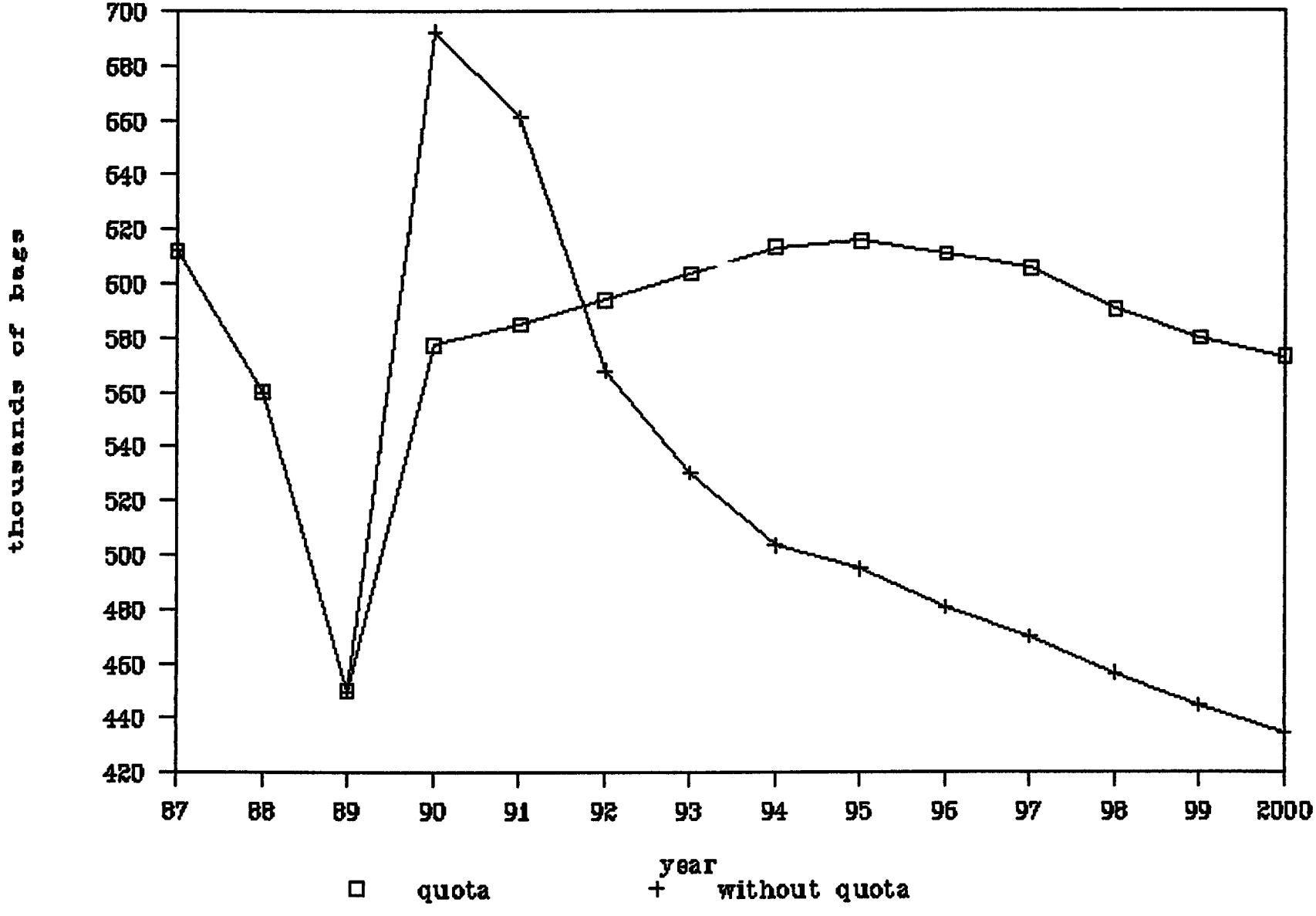
37. For production in the year 2000 to be sustained at its 1988 level, under the assumption of the continuation of the ICA export quota, it is estimated that a real producer price increase of about 5.7% is needed. If export quotas are not operative over that period a 31.1% real producer price increase will be needed.

38. Chart 3 presents projected Dominican exports under the two external scenarios--i.e., with and without the ICA export quota system. In the first year after the abolition of the export quota regime, exports increase to about 700,000 bags mainly due to the release of stocks accumulated during the quota years. However, after the initial jump, exports decline as the lower coffee prices cause production to decline.

39. If the ICA export quota system continues after 1990, Dominican exports are seen to increase up to year 1995. However, after 1995, the Dominican Republic will not be able to fulfill its export quota. Projecting the global export quota forward, the Dominican Republic's share should be

CHART 3: *Coffee Exports*

Dominican Republic



670,000 bags by the year 2000. In the year 2000 with the existing policies in place, export availability is projected to be 632,000 bags-- indicating that the quota could be filled only by driving stocks to near zero. (The simulations were based on the assumption of 110,000 bags as a reasonable level of working stocks.)

40. The main measure seen as providing an incentive for increased coffee production in the Dominican Republic is reduced export taxation and hence increased prices to producers. Under the "with quota" scenario, a 15.1% increase in producer prices will lead to an increase in production by about 10% in the year 2000 (see last column of Table 4). To achieve a 15.1% increase in producer prices an average export tax reduction of 33.3% is required. A 52.4% average tax reduction (28% increase in real producer prices) will be needed to achieve the production target by the year 2000 (the production target is domestic consumption plus an export market growth consistent with an increase in world coffee importr demand of 1.1% p.a.).

41. Prices in real terms fall under the "without quota" scenario. 1/ Under this scenario and without any change in producer price policy the gap between targeted production and actual production is about 39% by the year 2000. Real producer prices would have to increase by about 50% over what they would otherwise be in order to achieve the targeted production by the year 2000. For producer prices to increase by 50% export taxes have to be

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1/ On the average real producer prices are expected to fall about 25% during the first five years after the suspension of the quota scheme, but they would increase after that time.

abolished. Under the "without quota" scenario, if production is to remain at its present 1988/89 level by the year 2000, producer prices have to increase by 31%. For a 31% increase, a 68.6% average export tax decrease is required. The implications of these scenarios for export tax revenues and government revenue can be seen in Table 3.

Conclusions

42. Coffee is an important export crop for the Dominican Republic, accounting for an average of 11% of total exports by value over the 1982-84 period. However, coffee growing in the Dominican Republic has been characterized by low yields and stagnant production and exports over the last ten years or so. The low and stagnant yields (low-yielding by comparison with newer varieties) are a direct result of the very old age of the coffee trees, the low planting density and the poor husbandry. If the current policies affecting the coffee subsector continue it is very likely that coffee production and exports will decline. From field observation it was also found that, despite the good genetic qualities of the coffee trees grown in the Dominican Republic, the quality of the coffee beans produced is low due to inappropriate processing. The country has been having difficulty in filling its export quota under the International Coffee Agreement. It now faces the possibility of losing export quota share and therefore loss of the high-priced markets.

43. The two main recommendations of a mission from which this report has been taken were:

(i) Coffee washing stations should be established in order to improve the quality and marketability of the coffee beans.

(ii) A policy of real producer price increases should be adopted to avoid the prospective decline in coffee production.

44. The establishment of coffee washing stations was recommended because of the higher price that washed coffees can fetch on world markets and the recent shift in world demand towards better quality types of coffee. Because of this recent trend in world coffee demand, price premia for high quality washed coffee over other coffees have been increasing in recent years.

45. This report is concerned mostly with the second of the two recommendations. It reports the results of simulations with a small econometric model of the Dominican coffee sector which show that coffee production will decline if current policies continue. Simulations showed that the decline would be much steeper if the International Coffee Agreement (ICA) export quota agreement is not renewed in September of 1989. Reductions in export taxes to increase producer prices in real terms were evaluated in simulations of the model with and without the export quota. Tax cuts seem to be crucial if the export quota system is not renewed. Under the without-quota scenario and without tax cuts, real producer prices would fall significantly

(by about 30% in the first year and by 15-20% over the following three years); under these circumstances farmers would be likely to become disinterested in growing coffee.

46. Other model results suggest that: (i) if the ICA is continued, an export tax cut of 52% would achieve the desired production level (to meet projected quota and non-quota export demand) by the year 2000; and (ii) if the ICA is discontinued, the elimination of export tax is required to achieve the desired production level by year 2000. (It should be noted that the above calculations were made under the assumption that the tax rates would be adjusted to avoid bracket-creep problems.)

ANNEX TABLES

Annex Table 1: A COMPARISON OF UNIT VALUES OF EXPORTS BY ICA MEMBERS

Exporting Members	Coffee Year 1982/83	1983/84	1984/85	1985/86
	----------US¢/lb----------			
Colombian Milds				
Colombia	128.25	131.75	132.81	184.75
Kenya	129.67	141.40	145.39	170.38
Other Milds				
Costa Rica	121.95	134.13	133.46	182.91
Dominican Republic	117.05	130.03	127.71	164.41
El Salvador	123.26	135.40	129.43	170.14
Guatemala	121.12	131.01	130.12	160.57
Honduras	118.80	127.40	132.20	176.55
Mexico	126.21	139.72	135.26	179.10
Nicaragua	129.57	133.39	135.18	151.73
Papua New Guinea	118.80	129.53	132.73	167.87

Source: International Coffee Organization (ICO).

Annex Table 2: SIZE OF COFFEE FARMS IN THE DOMINICAN REPUBLIC

Size (in Tareas*)	Number of Farms	% of Farms	Surface Area (in Tareas)	% of Area
1-9	29,911	41.9	108,807	4.5
10-19	12,386	171.4	178,326	7.3
20-49	16,346	23.0	553,504	22.8
50-99	8,223	11.6	606,383	25.0
100-199	3,144	4.4	443,903	18.3
200-299	701	1.0	176,908	7.3
more than 300	524	0.7	360,587	14.8
Total	71,235	100.0	2,428,418	100.0

* 15.92 tareas = 1 ha.

Source: Seventh (VII) National Agricultural Census (1981)
Coffee Department/SEA.

Annex Table 3: AREA, TREE POPULATION AND PRODUCTION, 1960/61-1988/89
(AREA IN 1,000 HA, TREES IN 1,000,000 AND PRODUCTION IN 1,000 60 KILO BAGS)

	Beginning Month	Marketing Year	Area Planted	Area Harvested	Bearing Trees	Non-Bear Trees	Total Trees	Arabica Prod.	Robusta Prod.	Other Prod.	Total Prod.	Yield Kg/Ha
Dominican Rep.	July											
		1960/61	85	80	76	6	82	550	0	0	550	412
		1961/62	85	80	79	6	85	649	0	0	649	487
		1962/63	85	80	81	6	87	625	0	0	625	469
		1963/64	90	85	82	7	89	755	0	0	755	533
		1964/65	90	85	84	7	91	758	0	0	758	535
		1965/66	90	85	85	8	93	709	0	0	709	500
		1966/67	95	90	86	9	95	576	0	0	576	384
		1967/68	95	90	88	9	97	706	0	0	706	471
		1968/69	95	90	90	9	99	602	0	0	602	401
		1969/70	100	95	93	9	102	795	0	0	795	502
		1970/71	100	95	98	9	107	853	0	0	853	539
		1971/72	100	95	96	9	105	768	0	0	768	485
		1972/73	110	100	100	7	107	767	0	0	767	460
		1973/74	110	100	100	10	110	853	0	0	853	512
		1974/75	110	100	100	10	110	883	0	0	883	530
		1975/76	120	110	110	10	120	1,054	0	0	1,054	575
		1976/77	120	110	110	10	120	733	0	0	733	400
		1977/78	120	110	110	10	120	1,041	0	0	1,041	568
		1978/79	120	110	110	10	120	695	0	0	695	379
		1979/80	120	110	114	11	125	1,009	0	0	1,009	550
		1980/81	120	110	119	11	130	1,112	0	0	1,112	606
		1981/82	120	110	123	12	135	849	1	0	850	464
		1982/83	120	110	133	12	145	997	3	0	1,000	545
		1983/84	122	114	137	13	150	802	8	0	810	426
		1984/85	122	116	140	13	153	896	13	0	909	470
		1985/86	122	116	140	13	153	695	15	0	710	367
		1986/87	118	116	135	12	147	853	2	0	855	442
		1987/88	115	110	130	13	143	898	2	0	900	491
		1988/89	115	110	130	13	143	898	2	0	900	491

COFFEE SUPPLY & DISTRIBUTION 1960/61-1987/88
(IN THOUSANDS OF 60 KILOGRAM BAGS)

	Marketing Year	Begin-ning Stocks	Pro-duction	Im-ports	Total S/D	Domestic Use	Bean Exports	Roasted Ground Exports	Soluble Exports	Total Exports	Ending Stocks
Dominican Rep.	1960/61	50	550	0	600	195	329	0	0	329	76
	1961/62	76	649	0	725	201	459	0	0	459	65
	1962/63	65	625	0	690	208	423	0	0	423	59
	1963/64	59	755	0	814	214	536	0	0	536	64
	1964/65	64	758	0	822	221	522	0	0	522	79
	1965/66	79	709	0	788	228	421	0	0	421	139
	1966/67	139	576	0	715	235	394	0	0	394	86
	1967/68	86	706	0	792	242	445	0	0	445	105
	1968/69	105	602	0	707	249	338	0	0	338	120
	1969/70	120	795	0	915	257	486	35	0	521	137
	1970/71	137	853	0	990	265	441	29	0	470	255
	1971/72	255	768	0	1,023	273	391	48	0	439	311
	1972/73	311	767	0	1,078	281	635	37	0	672	125
	1973/74	125	853	0	978	290	527	76	0	603	85
	1974/75	85	883	0	968	298	415	96	0	511	159
	1975/76	159	1,054	0	1,213	285	731	95	0	826	102
	1976/77	102	733	0	835	246	377	118	0	495	94
	1977/78	94	1,041	0	1,135	270	730	78	0	808	57
	1978/79	57	695	0	752	280	306	118	0	424	48
	1979/80	48	1,009	0	1,057	285	578	84	0	662	110
	1980/81	110	1,112	0	1,222	290	501	62	0	563	369
	1981/82	369	850	0	1,219	295	506	95	0	601	323
	1982/83	323	1,000	0	1,323	300	526	0	0	526	497
	1983/84	497	810	0	1,307	302	528	1	1	530	475
	1984/85	475	909	0	1,384	305	600	5	3	608	471
	1985/86	471	710	0	1,181	295	531	5	0	536	350
	1986/87	350	855	0	1,205	300	612	0	0	612	293
	1987/88	293	900	0	1,193	310	560	0	0	560	323
	1988/89	323	900	0	1,223	318	450	0	0	450	455

Annex Table 4: DOMINICAN REPUBLIC COFFEE EXPORTS TO ICA MEMBERS AND NON-MEMBERS

Crop Year	Exports		
	Total	To ICA Members	To non-members of ICA
Starting 1 July	('000 bags)		
1968/69	338	338	0
1969/70	516	506	10
1971/71	471	443	28
1971/72	437	357	80
1972/73	657	616	41
1973/74	558	467	91
1974/75	485	373	112
1975/76	814	697	117
1976/77	482	374	108
1977/78	799	733	66
1978/79	425	306	119
1979/80	664	574	90
1980/81	474	416	58
1981/82	610	503	107
1982/83	509	509	0
1983/84	529	529	0
1984/85	542	510	32
1985/86*	569	546	23

Source: ICO.

* Estimated.

Annex Table 5: PROJECTED PRICES a/ UNDER ALTERNATIVE SCENARIOS

Year	Base Case (with quotas)	High GDP Growth and Lower Quotas	Lower GDP Growth and Higher Quotas	Base Case Without Quotas from 1990
	(1987 US¢/kg)			
1989	301 (137) b/	303 (138)	300 (136)	301 (137)
1990	303 (137)	307 (139)	298 (135)	216 (98)
1995	294 (133)	315 (143)	252 (114)	271 (123)
2000	294 (134)	335 (152)	240 (109)	304 (138)

a/ ICO "Other Milds" Indicator Price in 1987 prices.
b/ Figures in brackets are US¢/lb.

Source: IECCM, World Bank, Report 814/88, Price Prospects for Major Primary Commodities, November, 1988.

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